# *Massachusetts Water Resources Authority* Sustainability Plan

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This Sustainability Plan has been reviewed and approved by Frederick A. Laskey, Executive Director, April, 2005.

*Signature of Agency Head or other Appropriate Designee*

## 1. Agency Information, Impact Identification and Sustainability Team

### 1.1 Agency Description and Scope

The MWRA's mission is to provide reliable, cost-effective, high quality water and sewer services that protect public health, promote environmental stewardship, maintain customer confidence, and support a prosperous economy. MWRA delivers treated drinking water from three protected drinking water sources (Quabbin Reservoir, Ware River and Wachusett Reservoir) to 47 municipalities via a system of aqueducts, tunnels, pipelines, pump stations, and treatment facilities; each of the communities to which MWRA wholesales water has its own local distribution system to deliver water to homes and business. MWRA's interceptors, pump stations, and headworks facilities collect sewage and other wastewater from community collection systems of 43 communities for conveyance to the Deer Island Treatment Plant (DITP). DITP discharges treated effluent to Massachusetts Bay. MWRA also operates Clinton Wastewater Treatment Plant that discharges wastewater from Clinton and part of Lancaster to South Branch of Nashua River.

MWRA was created to achieve following goals, purposes and objectives:

1) Efficient and economical operating of water delivery and sewage collection, disposal and treatment systems, including programs for leak detection and reduction of infiltration and inflow for the service areas of the Authority

2) repair, replacement, rehabilitation, and modernization and extension of the delivery of water and sewage collection, disposal and treatment systems for the service areas of the Authority, including the financing on a self sustaining basis of capital and operating expenses relating thereto;

3) Establishment and administration of equitable charges, consistent the with the objectives of this act to conserve water and improve the quality of the environment, for water delivery and sewage collection, disposal, and treatment services.

Approximately 1270 people are employed at MWRA. MWRA's headquarters are located in leased space at Charlestown Navy Yard. MWRA also leases space at Chelsea, its Operations Center, where 530 staff are located. MWRA's facilities include:

- 1.2 billion mgd Deer Island Treatment Plant in Boston. MWRA's Central Laboratory is also housed at Deer Island. Deer Island also has 60 acres of public open space.
- 12 wastewater pumping stations (Weymouth, Quincy (3), Hingham, Somerville, Boston, Arlington, Wakefield, Framingham, Canton, Cambridge)
- 5 CSO facilities (Boston, Cambridge, Somerville)
- 4 headworks facilities (Quincy, Boston (2), Chelsea)
- 10 water pump stations (Arlington (2), Belmont, Waltham (1), Newton (2), Stoneham, Boston, Brookline (2).
- Covered distribution storage facilities (Weston (2), Marlborough, Stoneham (2), Ludlow)
- A new 405 mgd disinfection and corrosion control treatment facility under construction at Walnut Hill in Marlborough (to be brought on line in 2005)
- 20 mgd disinfection facility (Ware)
- Southborough Campus (Field Operations – Water Supply)
- Quabbin Laboratory
- Facilities at reservoirs and dams

## 1.2 Agency Impacts on the Environment and Human Health

The major operational activities of MWRA, and their effects on the environment are summarized in Table 1.

**TABLE 1**
**SUMMARY OF MAJOR OPERATIONS, ACTIVITIES AND IMPACTS**

| Major Operations | |
|---|---|
| - drinking water transmission, distribution and treatment (operation & maintenance of aqueducts, tunnels, pipelines, pump stations and treatment facilities)<br>- reservoir protection and management<br>- in-reservoir treatments<br>- water and wastewater quality sampling<br>-wastewater collection (operation and maintenance of pump stations, CSO facilities, and pipelines)<br>- wastewater treatment<br>- construction of system improvements<br>- pipeline maintenance<br>- laboratory testing and reporting<br>- facilities planning and design | - residuals processing<br>- wastewater discharge<br>- regulatory enforcement of sewer use regulations<br>- generation of electricity from methane<br>- hydropower generation<br>- metering and monitoring<br>- procurement of materials<br>- purchase or lease of real estate<br>- revenue collection<br>- fiscal and contract management<br>- grounds management and landscaping<br>- education<br>- data management and information |
| **Associated Activities** | |
| - operation of equipment<br>- maintenance of equipment<br>- pipeline maintenance<br>- lighting and heating<br>- pumping<br>- process control<br>- chemical handling<br>- collection of grit and screenings<br>- generation and disposal of solid waste<br>- civil/site construction<br>- generation of construction debris<br>- disposal of construction debris<br>- landscape irrigation<br>- mowing of right of ways<br>- excavation & treatment/disposal of contaminated soil/groundwater | - fleet management<br>- equipment management and support<br>- recycling<br>- purchasing of office supplies, equipment materials, computer supplies<br>- disposal of hazardous waste<br>- fuel storage<br>- chemical storage<br>- managing public access (DITP, Nut Island)<br>- managing contractors, professional services agreements<br>- maintaining and operating vehicles<br>- vehicle emissions<br>- building maintenance<br>- generation of reports |
| **Potential Environmental and Health Impacts** | |
| - beneficial water quality improvements<br>- water consumption<br>- air emissions from life cycles of products and services<br>- greenhouse gas emissions<br>- indoor air quality from materials used in building | - nutrient loading<br>- resource consumption and depletion<br>- waste disposal<br>- runoff<br>- managed runoff and discharges<br>-nitrogen oxides from combustion<br>-particulates |

### 1.3 Agency Operational Costs

In FY04, the costs for electricity, fossil fuels and others utilities such as water and sewer services paid by MWRA to the communities in which it operates facilities were approximately 18.4 million dollars. These costs represented approximately 11% of MWRA's direct expense budget. Utility costs associated with wastewater treatment facilities, and field operations, including water and wastewater pumping and water treatment, represented about 97% of this total. DITP represented the largest share of demand, although the numerous facilities throughout the some sixty communities served by MWRA also exerted demand. Very little of MWRA's utility costs were associated with administrative and office use.

### 1.4 Agency Sustainability Team Members

Denise Breiteneicher, Project Manager, Technical Support

Keith Colarusso, Deputy Purchasing Manager

Charles Coppola, Administrative Services

John Edgar, Senior Program Manager (Energy)

Charles Fino, Acting Manager, Vehicle Maintenance

Carolyn Fiore, Director, Toxic Reduction and Control

Pam Heidell, Policy and Planning Manager (MWRA State Sustainability Coordinator)

Jae Kim, Director, Capital Engineering and Construction

Leon Lataille, Environmental Manager

Kristen Patneaude, Project Manager, Deer Island Operations

Lauren Sloat, Senior Staff Counsel

## 2. Long-Term Goals/Vision

### 2.1 Long-Term Goals

> *The preservation and improvement of the health, welfare, and living conditions of the citizenry, the promotion and enlargement of industry and employment and all other aspects of commerce, the protection, conservation and management and development of water supplies and the environment depend on sound maintenance, operations and improvement of an adequate water supply distribution system and an adequate sewage collection, treatment and disposal system.* (MWRA Enabling Act).

Embedded in MWRA's Enabling Act are similar goals to those found in the State Sustainability Program.

- Promote water conservation.
- Protect the adequacy of a pure water supply
- Reduce wastewater flow and improve environmental quality.

Additional state sustainability goals that are integrated into MWRA's Business Plan and management policies include:

- Implement Energy Management systems
- Reduce chemical usage
- Maximize beneficial re-use of residuals.
- Develop new source reduction strategies for priority toxic issues
- Continued fleet optimization by pooling vehicles at different facilities
- Maintain environmental compliance at MWRA facilities

Illustrations of how MWRA's goals and objectives are aligned with the specific program areas of the State Sustainability Program are provided below. They are the starting point for MWRA's continuing state sustainability efforts.

1) Water Conservation and Water Quality

A conservation ethic is well established throughout the MWRA service area, evidenced by a system water demand that is the lowest it has been in nearly 50 years. Water conservation starts within the MWRA system with an active leak detection and repair program and extends to MWRA's requirements for its communities. Assurance of adequate quantity is couple with a sustained interest and commitment to watershed protection, the foundation of MWRA's integrated water supply improvement program. MWRA funds the DCR's watershed management program in the Quabbin Reservoir, Ware River and Wachusett Reservoir watersheds and also works with its contract communities to ensure that local source water supplies are appropriately protected.

MWRA is repairing and replacing its aging water and sewer infrastructure, to not only improve quality of service, but to reduce leakage in water pipes and to reduce infiltration into sewage interceptors. MWRA's community assistance programs are tailored to assist communities in their own infiltration/inflow reduction programs to reduce export of groundwater and stormwater and improve local recharge and streamflows.

2) Climate Change, Greenhouse Gas Emissions, Use of Renewable Fuels

Energy is a significant direct expense of MWRA. MWRA's long-term goal is to reduce energy costs and greenhouse emissions though energy efficiency, conservation, use of alternative fuels, and renewable energy such as hydropower. To achieve this goal, MWRA has embraced both demand side and supply side energy management efficiencies, and continues to undertake new initiatives.

3) Waste Reduction and Recycling/Environmentally Preferable Purchasing

A demonstration of MWRA's commitment to sustainability is MWRA's biosolids program. Initial sludge processing in digesters at Deer Island converts some of the waste stream to water (back to the plant) and methane, which is captured and used as fuel in steam turbines at Deer Island. Remaining sludge is then transported to processing facilities at Fore River Shipyard, where it is processed into fertilizer pellets for beneficial re-use. MWRA is one of the largest recyclers of organic material in the country. In this tradition, MWRA is embracing additional

opportunities for recycling, not just in its process streams but its by-products of everyday activities and operations.

4) Mercury and PBT Reduction

To both optimize the quality of wastewater discharge as well as to ensure a high quality biosolids product, MWRA emphasizes toxic reduction and control and reducing pollution at the source. MWRA's Toxic Reduction and Control (TRAC) Department uses a combination of permits, inspections and waste stream sampling and voluntary practices to increase awareness of municipalities, industries and households of the environmental implications of various practices. MWRA has been a long-term participant in mercury reduction efforts in the Commonwealth**.**

# 3. Short-term Actions and Priorities

## 3.1 Priority and Areas Goals

Regarding state sustainability, priority areas of MWRA and key short-term goals associated with these areas include the following.

1) Water use and conservation

- Continue current practices

2) Climate Change: Further reduce energy costs and greenhouse emissions.

- Identify and implement opportunities for increased energy efficiencies
- Continue to optimize generation of energy on site from renewable resources (steam turbine generators at DITP, hydropower at Cosgrove and Oakdale stations, and at DITP)
- Explore wind generation at Deer Island
- Use low emission vehicles, hybrids
- Energy audits for high energy consumption buildings

3) Waste Reduction and Recycling: Reduce materials sent to landfill and incineration and contain operating expenses by reducing trash disposal costs.

- Expand mixed paper recycling programs at MWRA
- Expand recycle program for fluorescent light bulbs
- Expand scrap metal recycling program
- Reduce paper use (including in contract/bid submittals)
- Expand glass, paper, aluminum container recycling program

4) Environmentally Preferable Purchasing: expand program for environmentally preferable purchasing.

- Identify and implement largest opportunities for use of EPPs
- Encourage use of EPPs in vendors/consultants who do business with MWRA

5) Mercury and PBT Reduction: Continue to pursue mercury reduction in MWRA practices and throughout the MWRA service area.

- Worked with industries and communities to reduce mercury and with households to use less toxic products.
- Continue to minimize use of metallic mercury in laboratory
- Continue program to remove and replace all mercury switches in vehicles
- Recycle batteries
- Continue implementation hazardous material waste management practices at facilities

### 3.2 Agency Action Steps

Please see Table 2, Agency Sustainability Plan Worksheet.

## 4. Management Systems and Institutionalization

### 4.1 Integrating Environmental Impacts into Key Decision Points

MWRA's employs life cycle cost analysis in its investment decisions; acquisition, capital requirements, operations, maintenance and disposal costs are considered when evaluating various alternatives and so resource needs, such as energy consumption through the life of a facility, are considered in MWRA's decision making process. MWRA's LCCA analysis guidelines are incorporated into contracts.

Other key decision points occur during the development of MWRA's Capital Improvement Program. Criteria that are used in the development of MWRA's capital improvements plan and in decisions to pursue projects include improving public health and providing environmental benefit. Then, as MWRA proceeds to implement its capital improvements, many of the projects are evaluated as part of the Massachusetts Environmental Policy Act and other permit processes. In this manner, environmental impacts are minimized.

### 4.2 Management Systems

MWRA does not have a formal Environmental Management System in place but has a number of other mechanisms to ensure that environmental responsibilities are allocated among staff. These mechanisms complement the core responsibilities of MWRA staff, whose job functions are often related to environmental improvement to begin with.

For air permits, hazardous waste management, underground storage tank management, SPCC plans, hazardous waste site cleanup, and other environmental regulatory requirements, MWRA's Real Property & Environmental Management Department (RPEM) uses centralized compliance calendars, a master permits list and related information on facility status as a basis for ongoing compliance efforts. Clean State Guidance is coordinated by RPEM and MWRA's Law Division.

MWRA also has an established "NPDES Steering Committee", which is a cross-divisional and multi-department endeavor that involves staff throughout MWRA. The goals of the Steering Committee include oversight of the development of a system of document control and tracking

and a centralized system for NPDES documentation, identification of emerging topics for strategic planning, and providing guidance on technical and policy issues and concerns.

# 5. Tracking Progress and Program/Plan Review

## 5.1 Agency Tracking and Reporting Form

The agency Tracking and Reporting Form will continue to be completed through a cooperative effort of MWRA's Sustainability Team members and MWRA's finance and administration staff. In many instances, data is regularly tracked as part of MWRA's budgeting and variance reporting. In other instances, staff with specific responsibilities identified in Table 2, Agency Sustainability Plan Work Plan Worksheet, will be tasked with monitoring and reporting on the progress of their respective tasks and projects.

## 5.2 Continuous Improvement

MWRA uses monthly and quarterly reporting, the Yellow Notebook and Orange Notebook, respectively, to track key indicators of performance and measure continuous improvement. These reports are widely distributed and discussed at Senior Staff, and quarterly, at meetings of MWRA Board of Directors. Currently, the Notebooks track NPDES compliance, drinking water quality, leak detection and repair, energy usage, and a host of other indicators – what gets managed, gets measured. Staff are also giving consideration to what other parameters relevant to State Sustainability might be appropriate to track in the Yellow and Orange Notebooks, such as tons recycled and solid waste disposal costs avoided.

The State Sustainability Program reinforces many priorities of MWRA. It is anticipated that each year, as MWRA completes the Agency Tracking and Reporting Form, staff will become more aware of data needs and sustainability concerns to be addressed. The Tracking Form is therefore a helpful tool that can be used internally by MWRA to evaluate the success of programs or to examine and trends and their causes (e.g. whether increased energy consumption a result of bringing new facilities on-line, or is it due to other operational factors where there is room for improvement?).

Education efforts, successful as part of MWRA's outreach to the public it serves, will also be a component of MWRA's continuous improvement on state sustainability issues. New brochures on water conservation, to be distributed to the communities, will also be provided to MWRA staff. Posters on recycling will be posted in conspicuous places as MWRA's recycling program expands. MWRA's sustainability team will also explore use of the intranet to encourage staff sustainability efforts.

Where measures of success include avoiding costs, such as receiving a check for scrap metal rather than paying a hauler to take scrap metal away, or reducing energy costs, these program successes will be documented and publicized to encourage further initiatives.

MWRA's Sustainability Team members represent a committed cross-section of MWRA staff and will periodically review and alter, if necessary, the MWRA's Plan.

# Table 2 - Agency Sustainability Plan Worksheet

| **Sustainable Goal:** Energy Use | **Benefits** | **Specific Tasks** | **Responsible Staff** | **Timeline** |
|---|---|---|---|---|
| Identify and implement opportunities for increased energy efficiencies | • Reduce energy costs<br>• Reduce greenhouse gas emissions<br>• Reduce reliance on fossil fuels | • Study opportunity for additional energy savings by retrofitting of lights and installation of motion detector lighting at DITP, Chelsea, CNY, and Walnut Hill. | K. Patneaude, J. Edgar, M. Flynn | DITP audit – FY06 |
| | | • Complete energy audits of headquarters and Chelsea Facility lighting to identify the potential for additional energy savings. Implement recommendations determined to be beneficial and cost effective. | M. Flynn, C. Guarini | Nov. 04 through Spring 05. |
| | | • Ventilation set-back and installation of control panels to reduce ventilation rates at headworks facilities | J. Edgar | Chelsea FY05, Ward Street and Columbus Park FY06 |
| | | • Study installation of VFDs at Water pump stations. | J. Edgar, D. Breiteneicher | VFD Study FY05 |
| | | • Replace inefficient steam heating systems at headworks facilities | J. Edgar | Chelsea FY05, Ward Street and Columbus Park FY06 |
| | | • Conduct energy audits by tracking energy usage via utility web based monitoring to target potential demand side management projects and to ensure that optimal maintenance and operations procedures are practiced. | K.Patneaude, J.Edgar | Energy tracking ongoing |
| | | • Use premium efficiency motors at new facilities and for motor replacements | J. Edgar, K. Patneaude | Ongoing |
| Increase generation of energy from renewable resources | • Reduce energy costs<br>• Reduce greenhouse gas emissions<br>• Reduce reliance on fossil fuels | • Pursue wind generation opportunities at DITP | K.Patneaude | Ongoing |
| | | • Optimize hydro generation at DITP, Cosgrove station, and Oakdale, including integration of Cosgrove operation with operation of Walnut Hill | J. Edgar, J. Kim, K. Patneaude | Ongoing |

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| | | WTP and implementation of Oakdale valve replacement project.<br>• Continue to optimize digester gas utilization<br>• Investigate potential of micro turbine electric generation at water pressure reducing valve locations | K.Patneaude<br><br>M. Johnson, J. Edgar | Ongoing<br><br>FY05 |
| Fleet management | • Reduce greenhouse gas emissions | • Further reduce fleet and pool vehicles | C. Fino | Ongoing |

| Sustainable Goal: Waste Reduction and Recycling | Benefits | Specific Tasks | Responsible Staff | Timeline |
|---|---|---|---|---|
| Increase mixed paper recycling programs at MWRA | • reduce disposal costs and needs<br>• reduce extraction of natural resources<br>• save energy and water used in manufacturing<br>• reduce emissions from incinerators | • Establish/continue mixed paper recycling program at the Chelsea Facility.<br>• Establish/continue Recycling Committee to develop a mission statement, goals and strategies, and to track and evaluate the success of recycling programs.<br>• Implement education plan, consistent with goals established by the MWRA Recycling Committee.<br>• Where practical, expand mixed paper recycling program at other MWRA locations | M. Flynn, C. Coppola<br><br>M. Flynn, C. Coppola<br><br>M. Flynn, C. Coppola<br><br>M. Flynn, C. Coppola | FY05<br><br>FY05<br><br>FY05<br><br>FY06 |
| Expand recycle program for fluorescent light bulbs | • reduce disposal costs and needs<br>• reduce extraction of natural resources<br>• save energy and water used in manufacturing | • Establish fluorescent light bulb recycling program at Chelsea Facility, and track and evaluate success of program | M. Flynn<br>C. Coppola | FY05 |
| Increase scrap metal | • reduce disposal costs | • Continue/expand scrap metal recycling | M. Flynn | FY05 |

| | | | | |
|---|---|---|---|---|
| recycling | and needs<br>• reduce extraction of natural resources<br>• save energy and water used in manufacturing | program at Chelsea facility | C. Coppola | |
| Reduce paper use | • reduce disposal costs and needs<br>• reduce extraction of natural resources | • Promote double sided printing of internal documents<br>• Where practical require double sided printing for external documents submitted to MWRA (including bid documents and proposals) | P. Heidell, K.Murray<br><br>K.Colarusso, K. Feeley | Ongoing<br><br>FY05 |
| Explore glass/paper/aluminum container recycling programs at MWRA | • reduce disposal costs and needs<br>• reduce extraction of natural resources<br>• save energy and water used in manufacturing | • If determined to be practical and cost-effective, establish glass/plastic/aluminum container recycling program at Chelsea facility and elsewhere | C. Coppola | |

| Sustainable Goal: Environmental Preferable Purchasing | Benefits | Specific Tasks | Responsible Staff | Timeline |
|---|---|---|---|---|
| Identify opportunities for use of EPPs and expand use of EPPs | • Conserve resources<br>• Reduce disposal costs | • Select recycled products and other green products in Authority wide office supply purchases whenever practical<br>• Continue to require use of Green List program of cleaning products at DITP and Chelsea. Explore use at CNY.<br>• Require use of "green" bathroom supplies at Chelsea and DITP<br>• Where practical, purchase recycled anti-freeze products | K. Colarusso, K. Feeley<br><br>K. Colarusso, K.Patneaude, M. Flynn<br><br>K. Colarusso, M. Flynn<br><br>K. Colarusso, C. Fino | FY05-06<br><br>FY06<br><br>FY06<br><br>Ongoing |
| Expand use of EPPs by those doing business with MWRA | • Conserve resources<br>• Reduce disposal costs | • Develop new language that will be incorporated into future RFQ/RFPs that will require submissions, where practical, to be on recycled products | K. Feeley, K. Colarusso | FY05 |
| | • decreases landfill | • Promote wider dissemination of | P. Heidell, C. Pawlowski | FY05 |

| | | | | |
|---|---|---|---|---|
| Expand use of MWRA's biosolids product | disposal costs<br>• decreases landfill space needs | information of MWRA biosolids product to other state agencies<br>• Require use of MWRA biosolids (Bay State Fertilizer) on MWRA property (replacement of traditional fertilizers if already used). | | |

| Sustainable Goal: Water Use and Conservation | Benefits | Specific Tasks | Responsible Staff | Timeline |
|---|---|---|---|---|
| Leak detection and repair | • reduce water usage | • Leak detection and repair for 286 miles of MWRA water distribution system<br>• Provide technical assistance to customer communities | D. Liston | Ongoing |
| Promote water conservation | • Reduce water usage<br><br>• Recycle water | • Educate employees on water conservation in the home and in the /office<br>• Encourage communities to conserve water by dissemination of water conservation materials and participation in MWRA programs<br>• Continue to encourage permitted sewer users to investigate and implement grey water systems where feasible for reverse osmosis reject streams | K. Hall<br><br>P. Heidell<br><br>C. Fiore | Ongoing, with renewed emphasis in 2005<br><br>Ongoing<br><br>Ongoing |
| Process improvements at DITP to continue to conserve water | • Reduce water usage | • Odor control process improvements in south system –replacement of wet scrubber with carbon absorption/n – to save approximately 21 mg a year | K. Patneaude | FY06 |

| Sustainable Goal: Mercury and PBT Reduction | Benefits | Specific Tasks | Responsible Staff | Timeline |
|---|---|---|---|---|
| Worked with industries and communities to reduce mercury | • Lower environmental and health risks<br>• Reduce pollution<br>• Maintain wastewater discharge criteria compliance | • Promote proper disposal of mercury and mercury containing products through implementation of pre-treatment program<br>• Through voluntary programs and education, encourage best management practices | C. Fiore | Ongoing |
| Reduce mercury use at MWRA. | • Lower environmental and health risks | • Continue implementation of hazardous material waste management practices at facilities, including review of mercury usage.<br>• Continue to minimized use of metallic mercury in laboratory<br>• Continue program to remove and replace all mercury switches in vehicles | L. Lataille<br>M. Delaney<br>C. Fino | Ongoing<br>Ongoing<br>Ongoing |
| Recycle batteries | • Increases useful life of nickel/cadmium batteries, minimizing disposal, and replacement frequency<br>• Eliminates batteries from waste stream | • Continue using battery discharges purchased in 2004. These extend the useful life of NiCad batteries by fully discharging them so they are then able to take full charge.<br>• Recycle batteries – expand practice | C. Fiore<br>L. Gallant, C. Fino | Ongoing<br>Ongoing |
| Encourage MWRA households to use less toxic or non-toxic household cleaners and pesticides, and to proper y dispose of automotive products | • Lower environmental and health risks<br>• Maintain wastewater discharge criteria compliance<br>• Reduce pollution | • Produce and distribute household hazardous waste booklet promoting pollution reduction at home | D. Breiteneicher, C.Fiore | FY05 and beyond |